UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,395	10/30/2003	Gary D. Tarver	200310687-1	3299

22879 7590 05/31/2006

HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER	
PARSONS, THOMAS H	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 05/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/699,395	TARVER ET AL.	
	Examiner	Art Unit	
	Thomas H. Parsons	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-59* is/are pending in the application.

4a) Of the above claim(s) *14,32 and 35-50* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13,15-31,33,34 and 51-59* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 14 and 32 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 13 April 2006.

2. Claims 35-49 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 13 April 2006.

Specification

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

The Examiner suggests amending the specification as appropriate to provided proper antecedent basis for the subject matter set forth in claim 20.

Claim Objections

4. Claim 5 is objected to because of the following informalities:

Line 3, suggest changing "said ***fluid*** manifold" to --said ***fuel*** manifold--

Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-3, 5-6, 11-13, 15-16, 20-25, 30-31, 33-34, 51-52, and 54-56 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishihara et al. (5,175,063).

Claim 1: Ishihara et al. in Figures 2, 7 and 8 disclose a fuel cell stack assembly (11), comprising:

opposing fuel cell stacks (1), the fuel cell stacks having a plurality of fuel cells, wherein the fuel cells include an anode (8), a cathode (10), and an electrolyte (9); and

a spacing member disposed between the opposing fuel cell stacks thereby defining a sealed fluidic cavity. See col. 2: 1-33, col. 3: 26-col. 4: 55, and col. 7: 25-30.

In particular, Ishihara et al. discloses on col. 1: 34-39, "There is known a fuel cell generator comprising a plurality of plate-like SOFC elements arranged parallelly and power generating rooms formed rigidly in a sealed manner between the SOFC elements, wherein oxygen gas and fuel gas are supplied from one end side of respective power generating rooms..." And, on col. 3: 26-32, "A plurality of plate-like SOFC elements are arranged parallelly with each other in such a manner that the air electrodes 10 of the adjacent plate-like SOFC elements

are opposed to each other with some distance and the fuel electrodes 8 of the adjacent plate-like SOFC elements are opposed to each other with some distance, so as to form an SOFC element array 11. This disclosure anticipates a ***spacing member defining a sealed fluidic cavity.***

Claim 2: Ishihara et al. a manifold fluidly coupled to the sealed fluidic cavity. Ishihara et al. disclose an oxidizing gas supply path and a fuel gas supply path for supplying an oxidizing gas and a fuel gas into respective power generating rooms. This anticipates a manifold fluidly coupled to the sealed fluidic cavity.

Claim 3: Ishihara et al. in Figures 7 and 8 disclose a fluid delivery needle (supply tubes 2) coupled to the manifold; the fluid delivery needle extending into the fluidic cavity (col. 4: 8-26).

Claim 5: Ishihara et al. disclose a fuel manifold incorporating an exhaust port (7) to remove excess fuel and waste products; and a fuel needle coupled to the fuel manifold. More particularly, Ishihara et al.'s disclosure of supplying a fuel gas to a fuel gas supply (tube) path having an inlet for discharging fuel gas into a power generating room anticipates a fuel manifold; and a fuel needle coupled to the fuel manifold (col. 2: 17-21).

Claim 6: Ishihara et al. disclose that the sealed fluidic cavity comprises a fuel cavity (power generation room)(In Figure 2, e.g., the space occupied by the fuel gas supply tube 3 has been construed as a fuel cavity).

Claim 11: Ishihara et al. in Figures 2, 7 and 8 disclose that a plurality of electrical interconnects (brushes 5) electrically coupling the plurality of fuel cells (col. 3: 59-col. 4: 7).

Claims 12 and 30: Ishihara et al. in Figures 2, 7 and 8 disclose electrical interconnects (brushes 5) comprise internal electrical interconnects.

Claim 13: Ishihara et al. in Figures 2, 7 and 8 disclose a plurality of electrodes (8, 10) coupled to the electrical interconnects.

Claims 15 and 33: Ishihara et al. In Figures 2, 7 and 9 disclose that the anodes (8) of each of the fuel cells are each adjacent the fuel cavity. In Figure 2, the space occupied by the fuel gas supply tube 3 has been construed as a fuel cavity.

The fuel cell stack assembly of claim 1, wherein said anodes of each of said fuel cells are each adjacent said fluidic cavity.

Claim 16: Ishihara et al. disclose that the fuel cells are connected in series (col. 10: 3-8).

Claim 20: Ishihara et al. in Figure 1 disclose a fuel manifold coupled to a first end of assembly, whereby the fuel cell cantilevers from the manifold.

Claim 21: Ishihara et al. in Figures 2, 7 and 8 disclose an electrochemical apparatus, comprising:

at least one fuel cell stack assembly (11), having: opposing fuel cell stacks (1), the fuel cell stacks having a plurality of fuel cells, wherein the fuel cells include an anode (8), a cathode (10), and an electrolyte (9);

a plurality of electrical interconnects (brushes 5) coupled to the fuel cell stacks;

plurality of electrodes (8, 10) coupled to the electrical interconnects;

a spacing member disposed between the fuel cell stacks thereby defining a fluidic cavity; and a manifold fluidly coupled to the fluidic cavity. See col. 2: 1-33, col. 3: 26-col. 4: 55, and col. 7: 25-30.

In particular, Ishihara et al. discloses on col. 1: 34-39, "There is known a fuel cell generator comprising a plurality of plate-like SOFC elements arranged parallelly and power

generating rooms formed rigidly in a sealed manner between the SOFC elements, wherein oxygen gas and fuel gas are supplied from one end side of respective power generating rooms..." And, on col. 3: 26-32, "A plurality of plate-like SOFC elements are arranged parallelly with each other in such a manner that the air electrodes 10 of the adjacent plate-like SOFC elements are opposed to each other with some distance and the fuel electrodes 8 of the adjacent plate-like SOFC elements are opposed to each other with some distance, so as to form an SOFC element array 11. This disclosure anticipates a ***spacing member defining a sealed fluidic cavity.***

Ishihara et al. disclose an oxidizing gas supply path and a fuel gas supply path for supplying an oxidizing gas and a fuel gas into respective power generating rooms. This anticipates a manifold fluidly coupled to the sealed fluidic cavity.

Claim 22: Ishihara et al. in Figures 2, 7 and 8 disclose a plurality of opposing fuel cell stack pairs; a spacing member disposed between each pair of fuel cell stacks; and a fluidic cavity defined between each pair of fuel cell stacks.

Claim 23: Ishihara et al. in Figures 2, 7 and 8 disclose a fluid delivery needle (supply tubes 2) coupled to the manifold; the fluid delivery needle extending into the fluidic cavity (power generation room)(col. 4: 8-26).

Claim 24: Ishihara et al. disclose a fuel manifold; and a fuel needle coupled to the fuel manifold. More particularly, Ishihara et al.'s disclosure of supplying a fuel gas to a fuel gas supply (tube) path having an inlet for discharging fuel gas into a power generating room anticipates a fuel manifold; and a fuel needle coupled to the fuel manifold (col. 2: 17-21).

Claim 25: Ishihara et al. disclose that the sealed fluidic cavity comprises a fuel cavity (power generation room)(In Figure 2, e.g., the space occupied by the fuel gas supply tube 3 has been construed as a fuel cavity).

Claim 31: Ishihara et al. disclose a fuel gas supply path for supplying a fuel gas into respective power generating rooms. This anticipates a fuel source coupled to a manifold.

Claim 34: Ishihara et al. in Figures 2, 7 and 8 disclose a plurality of fuel cell stack assemblies (col. 3: 26-32, col. 6: 60-63, and col. 7: 25-26).

Claim 51: Ishihara et al. in Figures 2, 7 and 8 disclose fuel cell system, comprising:

a plurality of fuel cell stacks (1);

means for supporting and separating the fuel cell stacks (4 and 12);

means for sealingly establishing a fluidic cavity (power generation room) between the fuel cell stacks; and

means (supply path (tube)) for providing a fluid to said fluidic cavity.

In particular, Ishihara et al. discloses on col. 1: 34-39, "There is known a fuel cell generator comprising a plurality of plate-like SOFC elements arranged parallelly and power generating rooms formed rigidly in a sealed manner between the SOFC elements, wherein oxygen gas and fuel gas are supplied from one end side of respective power generating rooms..." And, on col. 3: 26-32, "A plurality of plate-like SOFC elements are arranged parallelly with each other in such a manner that the air electrodes 10 of the adjacent plate-like SOFC elements are opposed to each other with some distance and the fuel electrodes 8 of the adjacent plate-like SOFC elements are opposed to each other with some distance, so as to form an SOFC element array 11. This disclosure anticipates a ***means for sealingly establishing a fluidic cavity***.

Claim 52: Ishihara et al. disclose a fluid comprising a fuel (col. 4: 48-52).

Claim 54: Ishihara et al. disclose in Figure 9 a means for withdrawing an electrical current from the system (col. 4: 56-59).

Claim 55: Ishihara et al. in Figure 9 disclose a means for supplying electrical current to an electronic device (40).

Claim 56: Ishihara et al. disclose a means (inlet) for providing a substantially constant quantity of fluid along a length of means for providing a fluid.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 4 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishihara et al. as applied to claims 1-3 above.

Claim 4: Ishihara et al. in Figures 2 and 7 disclose a fluid delivery needle (gas supply tubes) comprising a hole (inlet) disposed on the fluid delivery needle so that gases discharged into a power generating room advance radially (col. 4: 8-26). Ishihara et al. further disclose on col. 6: 43-55, "Moreover, in the oxidizing gas supply tube and the fuel gas supply tube passing respectively through the first power generating room 6A and the second power generating room 6B, ***the number, dimension, shape and position of the oxidizing gas supply inlet and the fuel gas supply inlet are varied arbitrarily***. Further, a gas flow direction is not limited to a parallel

direction, but the oxidizing gas flow direction can be set perpendicularly with respect to the fuel gas flow direction as shown in FIG. 5.

Accordingly, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have provided fluid delivery needle comprising: a plurality of gradient holes disposed on the fluid delivery needle; the gradient holes varying from a smaller size at a proximal end of the fluid delivery needle and increasing in size toward a distal end of said fluid delivery needle.

Claim 57: The rejection is as set forth above in claim 4 wherein Ishihara et al. disclose a single hole disposed in the means for providing a fluid but are silent as to a plurality of gradient holes disposed in the means for providing a fluid.

9. Claims 7-10, 17, 26-29 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishihara et al. as applied to claims 1 and 51 above, and further in view of Barnett (6,479,178).

Ishihara et al. are as applied, argued, and disclosed above, and incorporated herein.

Claims 7-10: Ishihara et al. do not disclose opposing fuel cell stacks comprising a ceramic material, opposing fuel cell stacks comprise a ceramic material; a spacing member comprising a ceramic material, and a spacing member and fuel cell stacks comprising materials having matched coefficients of thermal expansion.

Barnett discloses on col. 10: 50-50, "...The devices are deposited onto an electrically insulating ceramic that can be chosen for desired strength, toughness, thermal conductivity, and

thermal expansion match to cell components to provide improved mechanical strength and toughness.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the spacing member and fuel cell stacks of Ishihara et al. by incorporating the materials of Barnett because Barnett teach materials for the spacing member and fuel cells that would have provide improved mechanical strength and toughness thereby improving overall life and performance of the fuel cells.

Claim 17: Ishihara et al. does not disclose an integrated planar array of fuel cells. Barnett in Figure 7 discloses integrated planar array of fuel cells.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the apparatus of Ishihara et al. by integrating the planar array of fuel cells as taught by Barnett because Barnett teach the integrating fuel cell components and interconnects on a common support can reduce electrical resistances and interconnect conductivity requirements thereby improving overall fuel cell performance or function parameters.

Claims 26-29: The rejections of claims 26-29 are as set forth above in claim 7-10 above.

Claim 53: Ishihara et al. do not disclose a means for supplying an oxidant to an exterior of the fuel cell stack.

Barnett in Figure 7 discloses a means for supplying an oxidant to an exterior of the fuel cell stack.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the apparatus of Ishihara et al. by incorporating the means

of Barnett because Barnett teaches a means for supplying an oxidant to an exterior of the fuel cell stack that would have simplified gas manifolding and sealing thereby improving the overall cost and operations of the fuel cell stack.

10. Claims 18-19 and 58-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishihara et al. as applied to claims 1 above, and further in view of Nakanishi et al. (4,910,100).

Ishihara et al. are as applied, argued, and disclosed above, and incorporated herein.

Claim 18-19 and 58-59: Ishihara et al. do not disclose flow field modification features, wherein the flow field modification features comprise a serpentine path.

Nakanishi et al. in Figures 1, 2 and 12 disclose flow field modification features (guide vanes), wherein the flow field modification features comprise a serpentine path (col. 4: 3-48).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cell of Ishihara et al. by incorporating the flow field modification features of Nakanishi et al. because Nakanishi et al. teach flow field modification features that would have shortened the travel path of reactant gases sufficiently to circumvent thermal failure of cell components thereby ensuring improving reliability and operating characteristics (col. 3: 5-12).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas H. Parsons whose telephone number is (571) 272-1290. The examiner can normally be reached on M-F (7:00-4:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Thomas H Parsons
Examiner
Art Unit 1745

***

DAH-WEI YUAN
PRIMARY EXAMINER